

# A NEW VARIETY OF *PHYSARIA NEWBERRYI* (BRASSICACEAE) FROM NEW MEXICO

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## ABSTRACT

The new variety *Physaria newberryi* var. *yesicola* is described and illustrated. It is readily distinguished within *P. newberryi* by its very long styles. Variety *yesicola* occurs upon the gypsaceous Yeso Formation in the Sierra Lucero of west-central New Mexico.

## RESUMEN

Se describe y se ilustra una nueva variedad *Physaria newberryi* var. *yesicola*. Se distingue fácilmente de *P. newberryi* por sus estilos muy largos. La variedad *yesicola* aparece en suelos gipsícolas de la Formación Yeso en la Sierra Lucero del centro-oeste de Nuevo México.

***Physaria newberryi* A. Gray var. *yesicola* Sivinski, var. nov. (Fig. 1). TYPE:**

U.S.A. NEW MEXICO. Valencia Co.: NE side of Sierra Lucero ca 37 km W of Los Lunas, T6N R3W Section 2 NW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub>, 34°46'54"N 107°07'48"W, elev. 1800 m, 4 May 1998, R. Sivinski & C. McDonald 4335 (HOLOTYPE: UNM; ISOTYPES: ARIZ, BRY, CAS, GH, MO, NY, US).

A *Physaria newberryi* A. Gray var. *racemosa* Rollins stylis filiformibus (5–9 mm longis) et racemis fructiferis brevibus (2.5–5 cm longis) differt.

*Long-lived caespitose perennial with diffusely branching caudex forming mounded clumps 10–30 cm in diameter; caudex branches thickly clothed with marcescent leaf bases and terminated by clusters of ascending to erect leaves; stems and leaves densely covered with overlapping stellate-discoid trichomes, trichome rays confluent for at least 1/2 their length and often to near their apex; basal leaves narrowly oblanceolate to broadly spatulate, 3–8 cm long (including petiole), acute to obtuse, margins entire or with a few broad teeth, the winged petiole less than to 2 times as long as the expanded blade; cauline leaves few, sessile, 1–1.5 cm long, linear-oblanceolate; stems numerous and arising from the axils of basal leaves, ascending to erect; mature racemes 2.5–*

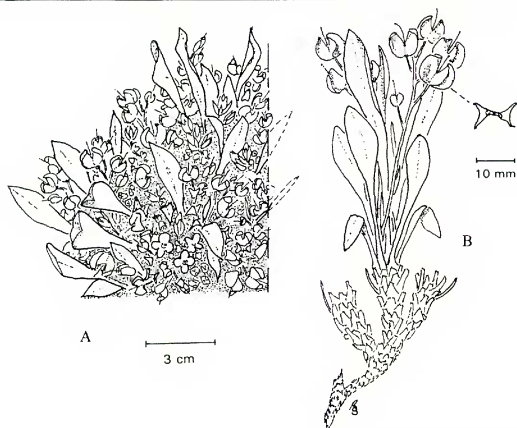


FIG. 1. *Physaria newberryi* var. *yesicola* Sivinski var. nov., (A) growth form (one-half of caespitose mound), (B) detail of plant and latitudinal cross-section of silicle from *Sivinski & McDonald* 4335.

cm long; fruiting pedicels straight, ascending or divergent, 6–11 mm long; sepals greenish yellow, pubescent, lanceolate and somewhat cucullate, 6–7 mm long and 1.0–1.5 mm wide; petals yellow, oblanceolate to spatulate, 7–8 mm long and 1.5–2.0 mm wide; *silicles* papery, pubescent, becoming purplish at maturity, deeply cleft at the apex with a V-shaped sinus and with little or no basal cleft, fruit cross-section X-shaped with concave valve sides and dorsal surface, valve margins and sinus crests sharply keeled, each valve 6–9 mm long and 4–7 mm wide; *repla* 2.5–3.5 mm long, narrow to nearly closed, acute at the apex; fruiting styles thread-like, 5–9 mm long, surpassing the apical cleft of the silicle; ovules 2 per valve; seeds ovate, slightly compressed.

Additional specimens examined: NEW MEXICO: Cibola Co.: canyon on the west side of Sierra Lucero, ca 47 km S of Laguna Pueblo, T5N R5W Section 36 NE $\frac{1}{4}$ , 34°37'13"N 107°18'55"W, elev. 2040 m, 14 May 1998, R.C. Sivinski 4368 (ASC, COLO, ISTC, NMC, RENO, RM, UNM, UT). Valencia Co.: Laguna Pueblo Reservation, NE side of Mesa Lucero, 34°50'14"N, 107°6'43"W, elev. 1740 m, 24 Sep 1997, R. Sivinski, T. Lourey & B. Miller 4160 (UNM).

*Distribution and Habitat.*—Variety *yesicola* is presently known only from the Sierra Lucero Range (including Mesa Lucero) of Cibola and Valencia

counties in west-central New Mexico (Fig. 2). This population is the extreme southeastern range limit for the species. It occurs on sandy gypsum and other silty strata of the Permian age Yeso Formation. The Yeso Formation is 200 to 300 meters thick in the Sierra Lucero. It is comprised of a soft, silty sandstone interbedded with gypsum, limestone, shale and siltstone strata of various thicknesses (Weber & Kottlowski 1959). Variety *yesicola* occurs on silty sand substrates that contain obvious quantities of gypsum. It is also locally abundant on adjacent siltstone and silty limestone strata which may be mildly gypseous, but have not been analyzed.

The habitat is nearly barren badlands and canyon sides of various slopes and exposures between the elevations of 1700 and 2100 m. *Juniperus monosperma* (Engelm.) Sarg. trees are scattered across this formation and the shrubby and herbaceous vegetation varies with the geologic strata. Common associates on sandy gypsum are *Tiquilia hispidissima* (Torr.) A. Richardson, *Selinocarpus lanceolatus* Wooton, *Calylophus bartwegii* subsp. *filifolius* (Eastw.) Townner & Raven, *Cryptantha fulvocanescens* S. Wats., *Artemisia bigelovii* A. Gray, *Tetradymia filifolia* Greene, *Lycium pallidum* Miers, *Sporobolus nealleyi* Vasey and *Stipa comata* Trin. & Rupr. The most frequent gypsum habitat associate is an undescribed *Phacelia* that is in preparation for publication by Tim Lowrey and Paul Knight (UNM) with Dwane Atwood (BRY). Associates on silty limestones or siltstones are more variable, but often consist of *Ephedra torreyana* S. Wats., *Rhus trilobata* Nutt., *Eriogonum corymbosum* Benth., *Nolina greenii* S. Wats., *Aristida purpurea* var. *fendleriana* (Steud.) Vasey and *Schizachyrium neomexicanum* Nash.

*Taxonomic Relationships.*—*Physaria newberryi* is broadly, but sporadically, distributed through northwestern New Mexico, northern Arizona and southern Utah (Rollins 1993). It is closely related to *Physaria acutifolia* Rydberg (Montana to New Mexico and Utah) and *Physaria chambersii* Rollins of the Great Basin (Mulligan 1967). These three species can usually be distinguished with the following key:

1. Dorsal margins of silicle valves acutely angled (nearly winged); replum apex acute to acuminate (observable after valves have shed); trichome rays confluent for 1/2 or more their length ..... *P. newberryi*
1. Dorsal margins of silicle valves obtusely angled or broadly rounded; replum apex obtuse or rounded; trichome rays confluent or free ..... (2)
2. Silicles apically cleft with a deep, narrow or V-shaped sinus and with a shallow or no basal sinus at the point of pedicel attachment, valves often obtusely angled; trichome rays usually free (confluent in var. *membranacea*) ..... *P. chambersii*
2. Silicles narrowly cleft at both the apex and base, valves broadly rounded; trichome rays free or confluent for nearly 1/2 their length ..... *P. acutifolia*

The taxonomic boundaries among these species are notably blurred by intergrading polyploid races, especially in central and southern Utah (Mulligan

1967; Welsh et al. 1993). The distinctively angled silicle valves of *Physaria newberryi* make it the most well-marked and distinguishable species of this group (Fig. 1).

#### KEY TO THE VARIETIES OF *PHYSARIA NEWBERRYI*

1. Styles filiform, 5–9 mm long, surpassing the crest of the apical silicle sinus; repla 2.5–3.5 mm long; racemes 2–5 cm long ..... var. *yesicola*
1. Styles stout, <4 mm long, usually shorter than the silicle sinus; replum and racemes lengths not combined as above ..... (2)
2. Repla 4–10 mm long; racemes usually 2–5 cm long (rarely up to 10 cm) ..... var. *newberryi*
2. Repla 2–3.5 mm long; racemes 5–10 cm long ..... var. *racemosa*

Variety *yesicola* and var. *racemosa* both have short repla and the latter has also been collected from gypseous substrate (Gierish 4214, ARIZ, BYU). Variety *racemosa* is a minor peripheral variant in northwestern Arizona and southwestern Utah that possesses a unique combination of replum and raceme lengths, but no single distinguishing morphological characteristic. Welsh (1993) considers *racemosa* an insignificant phase that grades into var. *newberryi*. In contrast, var. *yesicola* is an isolated disjunct with long, filiform styles that are unique within this species.

The combination of confluent trichome rays and V-shaped apical silicle sinus in var. *yesicola* is also similar to *P. chambersii* var. *membranacea* Rollins (syn. *P. lepidota* Rollins) of south-central Utah. Yet the long slender styles and short repla of var. *yesicola* are nearly as unusual for *P. chambersii* as they are for *P. newberryi*. In this case, I place the utmost taxonomic importance on silicle shape. The valve margins of var. *yesicola* are sharply keeled from the silicle base to the crest of the apical sinus and the valve surfaces are concave and less inflated than *P. chambersii*. These silicle features are characteristic of *P. newberryi* and clearly place *yesicola* close to that species. The long styles of *P. newberryi* var. *yesicola* are a conspicuous departure from the usual circumscription of this species and further obscures the taxonomic boundaries between it and other related taxa. Additional study of this species group is needed and may find justification for reducing some species to infraspecific status within *P. newberryi* or else elevating var. *yesicola* to species level.

At present, var. *yesicola* is known only from the Sierra Lucero and appears to be geographically isolated from other *Physaria* taxa (Fig. 2). It is locally abundant and morphologically consistent in this 50 km range of low mountains. This unique plant is another addition to a growing list of taxa endemic to the gypsum formations of New Mexico.

*Etymology*.—This new variety dwells upon the Yeso Formation in the Sierra Lucero, hence the name *yesicola*. Yeso is the Spanish word for 'gypsum' which is a fitting name for this geologic feature.

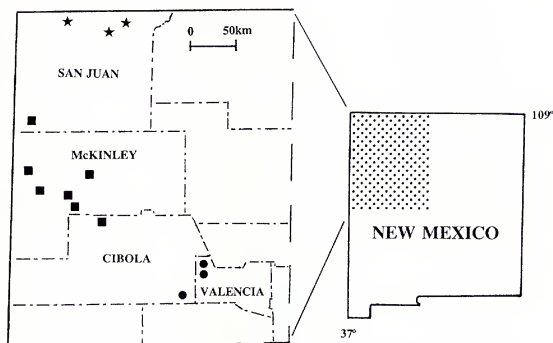


FIG. 2. Distribution of *Physaria newberryi* var. *newberryi*: ■, *P. newberryi* var. *yesicola*: ●, and *P. acutifolia*: ★ in New Mexico.

#### ACKNOWLEDGMENTS

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